

REMARKS

Claims 79-110 were presented for examination, and were variously rejected. Claims 1-78 were previously canceled. Claims 92 and 98 were amended to correct obvious typographical errors, as was claim 94. Claim 97 was canceled. No new matter is added by the amendments.

Claims 79-96 and 98-110 are now presented for examination. Entry of the amendments and reconsideration in view of the following remarks are respectfully requested.

Objections

The Examiner objected to claim 94 for an obvious typographical error. That error is corrected by the present amendment, thus this objection is overcome.

Rejections under 35 U.S.C. § 112

Claim 97 was rejected as allegedly indefinite, because it depends from claim 95 that recites a “traveling wave magnetophoresis structure”, while claim 97 recites “at least one electromagnetic element.” According to the Examiner, it is unclear whether the electromagnetic element of claim 97 is part of the magnetophoresis structure of claim 95.

Claim 97 has been canceled; accordingly, this rejection is rendered moot.

Rejections under 35 U.S.C. § 103

Claims 79, 81-95, 97-110 were rejected as obvious in view of Pourahmadi, et al., U.S. 6,440,725. Pourahmadi, et al., according to the Examiner, “disclose a biochip system wherein at least one of the chips (col. 2, lines 27-33) is a multiple force chip (col. 19, lines 17-19, and col. 25, lines 45-50 and figures 6 and 7 disclosing resistive heating element 34 on the bottom surface of substrate 22, and col. 21, line 35-col. 22, line 2, disclosing electrodes in contact with fluid for manipulation of molecules)...”

The applicants respectfully traverse this rejection. As a preliminary matter, in order to apply Pourahmadi, it is critical to recognize what Pourahmadi describes. Pourahmadi relates to an “Integrated Fluid Manipulation Cartridge” (title and abstract) for processing relatively large volumes of fluid (abstract). The Cartridge can comprise “any combination of microscale to macroscale channels, chambers, reservoirs, detection and processing regions. This makes it possible to exploit the key attributes of microfabricated chips and other miniature fluidic or analytical components in a conventional, cartridge-type, physical environment.” Accordingly, when considering the disclosures of Pourahmadi, it is essential to recognize that it is often describing a cartridge having multiple components, some of which *may* be chips. The different functions of the cartridge may be provided by separate elements, each of which may or may not be a chip, and certain forces acting on the cartridge are applied externally.

Pourahmadi does not appear to disclose or suggest a “multiple force chip” at all. A “multiple force chip” is described in the specification as one that “generates physical force fields and that has at least two different types of built-in structures” to generate those fields. Page 19, lines 6-9. Physical fields are described as a region of space where “forces are produced on a moiety as a result of the interaction between the moiety and the field. A moiety can be manipulated within a field via the physical forces exerted on the moiety by the field....Exemplary fields include electric, magnetic, acoustic, optical and velocity fields.” Page 20, lines 18-24.

The Examiner pointed to a resistive heater mentioned in Pourahmadi, presumably as one example of a source of a physical field; however, the reference does not disclose or suggest that a resistive heater produces a physical field as that term is used in the present specification and claims. Its resistive heater as depicted in Figures 6 and 7 and as described in the reference appears only to control the temperature of a region of a cartridge or component: it is a means to control temperature, not to manipulate a moiety; and the description of those resistive heaters does not disclose or suggest that they could function to manipulate a moiety. Nor does the resistive heater produce a field meeting the characteristics that define a physical field in the specification, which would require localized heating to produce a temperature gradient to induce a directed particle movement. Accordingly, the resistive heater of Pourahmadi does not disclose or suggest a means to

manipulate a particle, and its heating means does not disclose or suggest means to produce one of the ‘forces’ to provide a multiple force chip.

The Examiner also pointed to disclosure of a pair of electrodes in column 21 of the cited reference; however, such electrodes would only provide one type of physical force, at most. Nothing in the cited passage describing those electrodes discloses or suggests using such electrodes in combination with a second type of physical field: it describes their use for dielectrophoresis, an “electronic technique useful for movement and isolation of biomolecules...” Col. 21, line 56-57. The reference thus does not disclose or suggest a multiple force chip as that term is used in the application and claims.

Furthermore, in rejecting claim 81, the Examiner asserted that Pourahmadi’s chip “further comprises an electromagnetic element (col. 18, lines 40-50).” However, the cited paragraph in Pourahmadi clearly teaches this: “the cartridge may be fabricated in such a way that specific regions or regions [sic] may interact with the external environment via magnetic forces....By applying a series of magnetic fields to the cartridge...” Col. 18, lines 40-46, emphases added. Thus the reference does not disclose or suggest a chip having an electromagnetic element built in as required for a multiple force chip: it discloses the use of an external magnetic field to affect a region of a cartridge, which may contain various elements, some of which could be chips. Claim 81 is thus not rendered obvious by the reference.

With regard to claim 95, which is an independent claim, the Examiner asserts that “an array of electromagnetic units can move one or more sample components from one area of the chip to another area of the chip by traveling wave magnetophoresis (col. 18, lines 40-50).” However, the cited passage in Pourahmadi does not disclose or suggest an array of electromagnetic units on a chip: it refers to magnetic fields that are applied to the cartridge by external means as discussed above, or they are used to “operate small valves within the cartridge for fluid control.” Col. 18, lines 51-54. Those valves are not indicated to be part of a chip, either; they appear to be external magnets. Thus neither of these passages discloses or suggests a chip comprising the ‘traveling wave

magnetophoresis structure' of claim 95. Accordingly, claim 95 is not rendered obvious by the cited reference.

A *prima facie* obviousness rejection based on a single reference requires the Examiner to show that the reference discloses or suggests all limitations of the claim. Pourahmadi does not disclose the multiple force chip of claim 80, nor does it disclose a chip comprising a traveling wave magnetophoresis structure as required by claim 95. Accordingly, these obviousness rejections should be withdrawn.

Claims 80 and 96 were alleged to be obvious in view of Pourahmadi in combination with Anderson, et al., U.S. Patent No. 6,168,948. According to the Examiner, Anderson was added to disclose a chip comprising an acoustic element that is not disclosed or suggested by Pourahmadi. Anderson is said to disclose an acoustic element for mixing a sample. Allegedly, in view of Anderson, "it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an acoustic element as taught by Anderson et al. in the Pourahmadi et al chip because Anderson et al. teach that it provides the advantages of allowing for mixing or lysing of cells, as may be desirable by one skilled in the art during performance of an assay."

The applicant traverses this rejection. As shown above, Pourahmadi does not disclose or suggest a multiple force chip as required by each of the claims. Anderson appears to disclose only the use of an acoustic force to mix materials within a chamber, it does not disclose or suggest a multiple force chip using an acoustic force, let alone one with a built-in structure for generating that acoustic force. Nor does it appear to disclose the use of an acoustic force in combination with any other built-in physical field generating structures.

The applicant notes that Pourahmadi does disclose an ultrasonic horn, which may be considered an acoustic element, and is used for lysing cells. Col. 33, line 57 to col. 34, line 10. However, as the Examiner may have recognized, the ultrasonic horn "is coupled to the cartridge" (col. 33, lines 57-58) rather than being part of a chip.

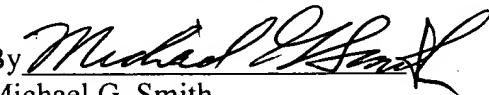
Accordingly, Anderson does not remedy the deficiencies of Pourahmadi. Pourahmadi does not disclose a multiple force chip at all, as that term is used in the claims. The person of ordinary skill thus would not have been motivated to modify Pourahmadi by adding the acoustic force mixing element of Anderson to arrive at the invention as claimed in claims 80 and 95. The combination of references fails to disclose or suggest the multiple force chip of the claims, and this rejection should be withdrawn.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no.471842001500. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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